W. Swallow

The relation of incubation temperature to the mortality of fish embryos. ~~BU-200~~

BU-310-M

Abstract

Considerable evidence suggests that environmental factors, particularly temperature conditions during embryo development, markedly affect year-class strength for many fish species. This paper therefore attempts to summarize the state of our knowledge of the effects of incubation temperature on developing fish embryos.

Sufficiently high or low incubation temperatures can kill fish embryos directly. In the field a negative correlation between incubation temperature and embryo mortality has been observed for many species. The amount of temperature fluctuation during incubation seems to be positively correlated with embryo mortality. Unfavorable incubation temperatures may also lead to the production of deformed fry.

The tolerance by fish embryos of unfavorable incubation temperatures varies according to their stage of development. Embryos appear to be particularly vulnerable during the early cleavages up to the formation of the blastula, just prior to gastrulation, at the closing of the blastopore, and just before hatching.

Species differ considerably in temperature tolerance. For tolerant species of centrarchids and salmonids, the indirect effects of temperature may be more important than the direct effects in nature, although the direct effects can be observed in the laboratory.

Also BU-310-M